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(54) **COMMUNICATION SYSTEM FOR AN AIRCRAFT**

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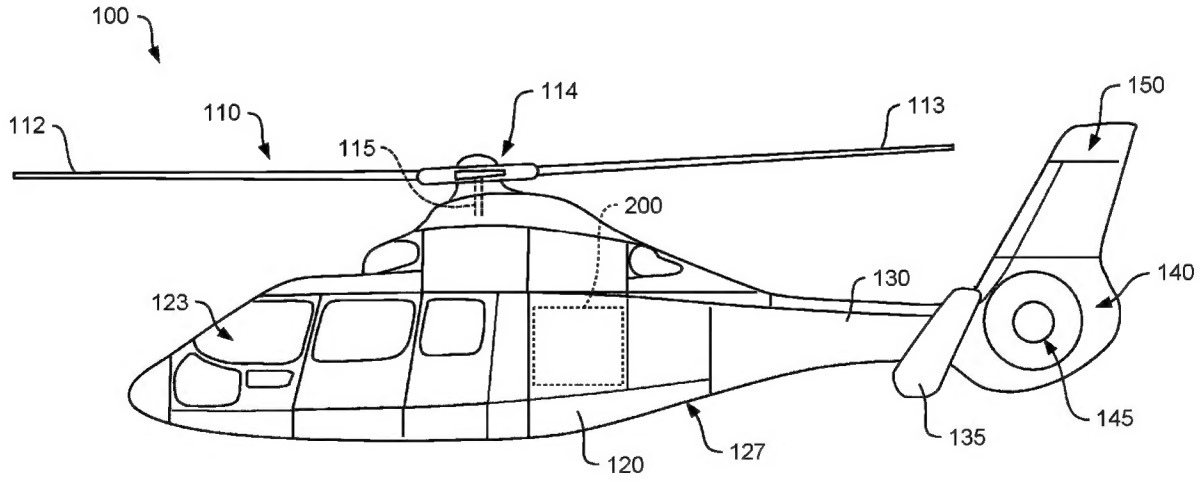
CPC ***G08G 5/0004*** (2013.01)

(57) **ABSTRACT**

A communication system for an aircraft, comprising a plurality of radios including at least a first radio that is operable in an encrypted mode for transmitting/receiving encrypted audio signals, and a second radio that is operable in a clear mode for transmitting/receiving unencrypted audio signals; an intercom system that interconnects the plurality of radios, wherein the plurality of radios is connected to the intercom system via a plurality of communication lines; and a security module that is configured to connect or disconnect selected ones of the plurality of communication lines for inhibiting simultaneous transmission of an encrypted audio signal via the first radio and an unencrypted audio signal via the second radio.



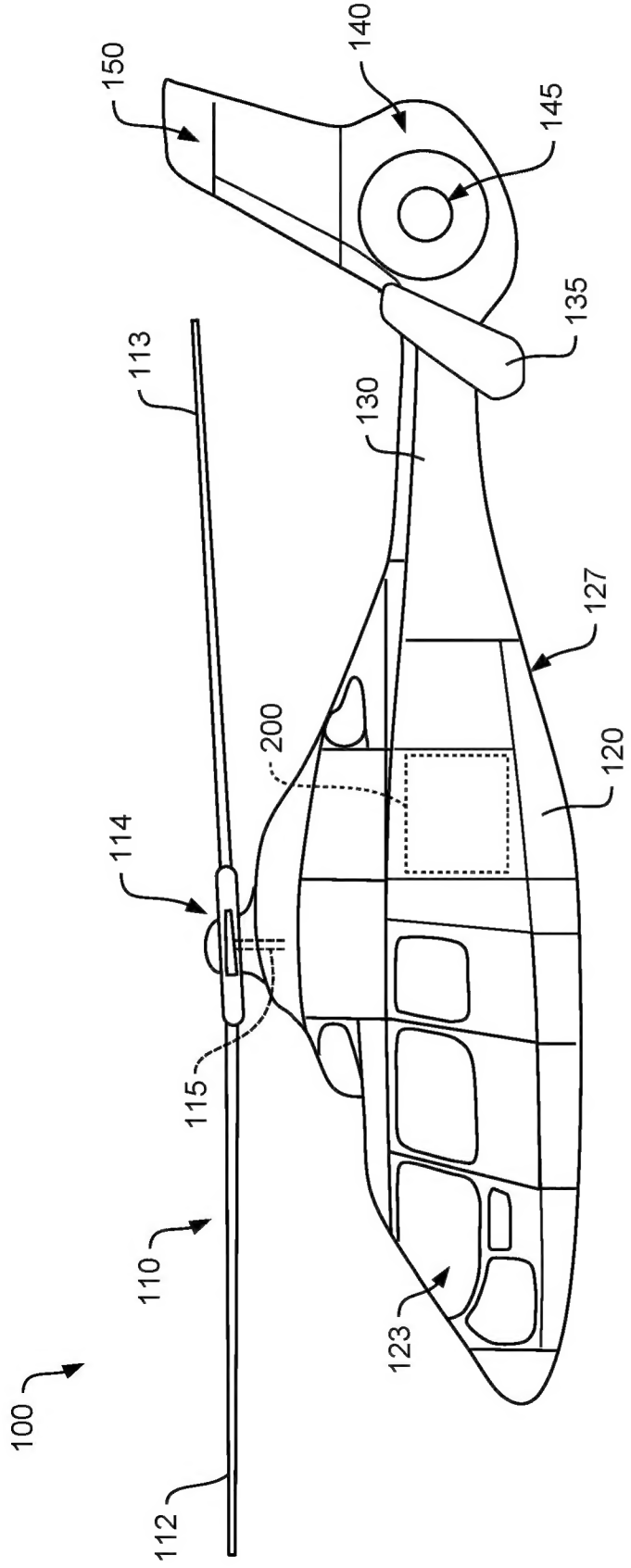


FIG. 1

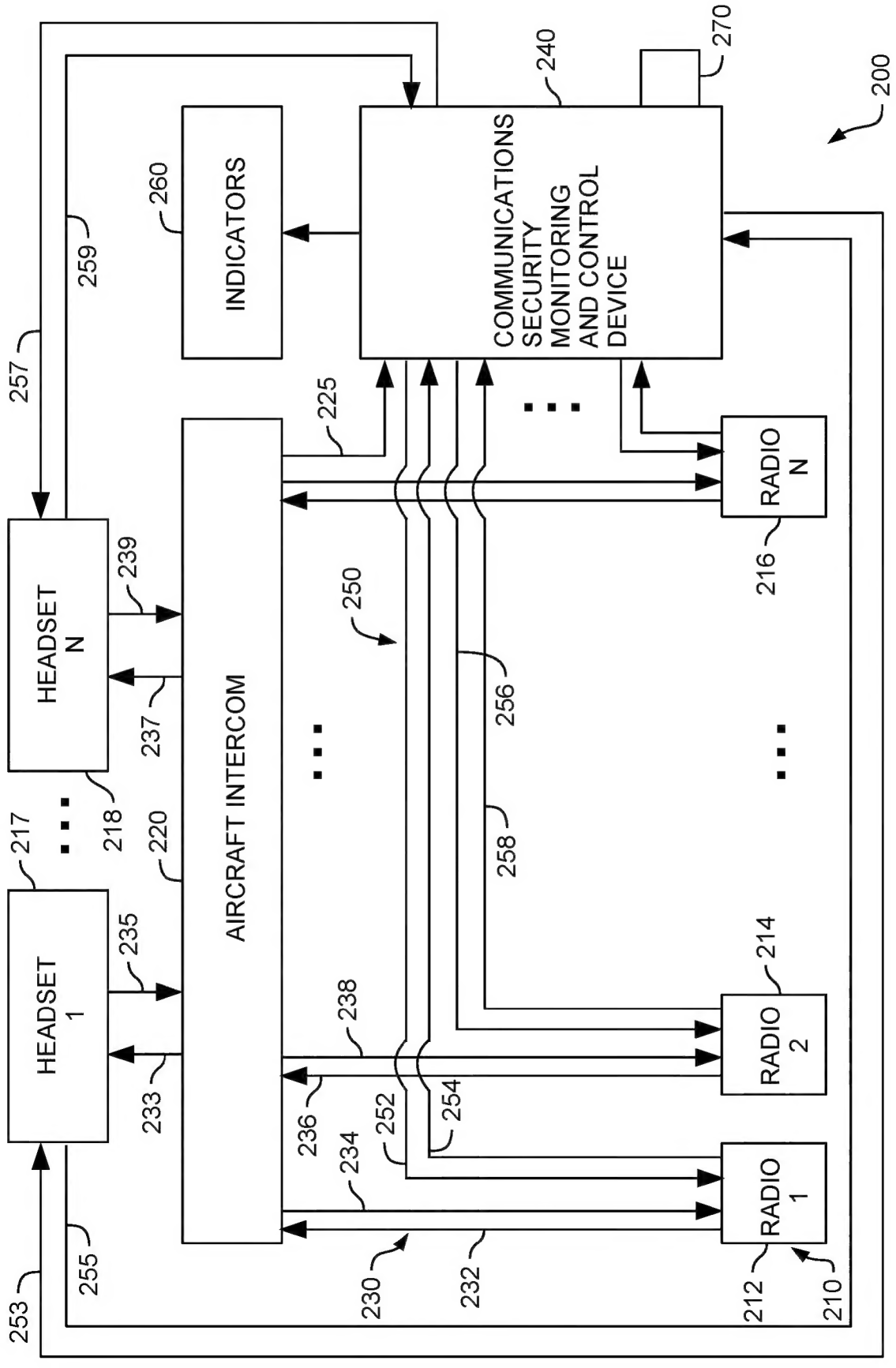

200
240
270
260
INDICATORS
COMMUNICATIONS SECURITY MONITORING AND CONTROL DEVICE
259
257
225
AIRCRAFT INTERCOM
220
HEADSET N
239
237
218
HEADSET 1
235
233
217
RADIO N
216
250
256
258
RADIO 2
214
238
236
234
252
254
RADIO 1
212
210
230
232
255
253

FIG. 2

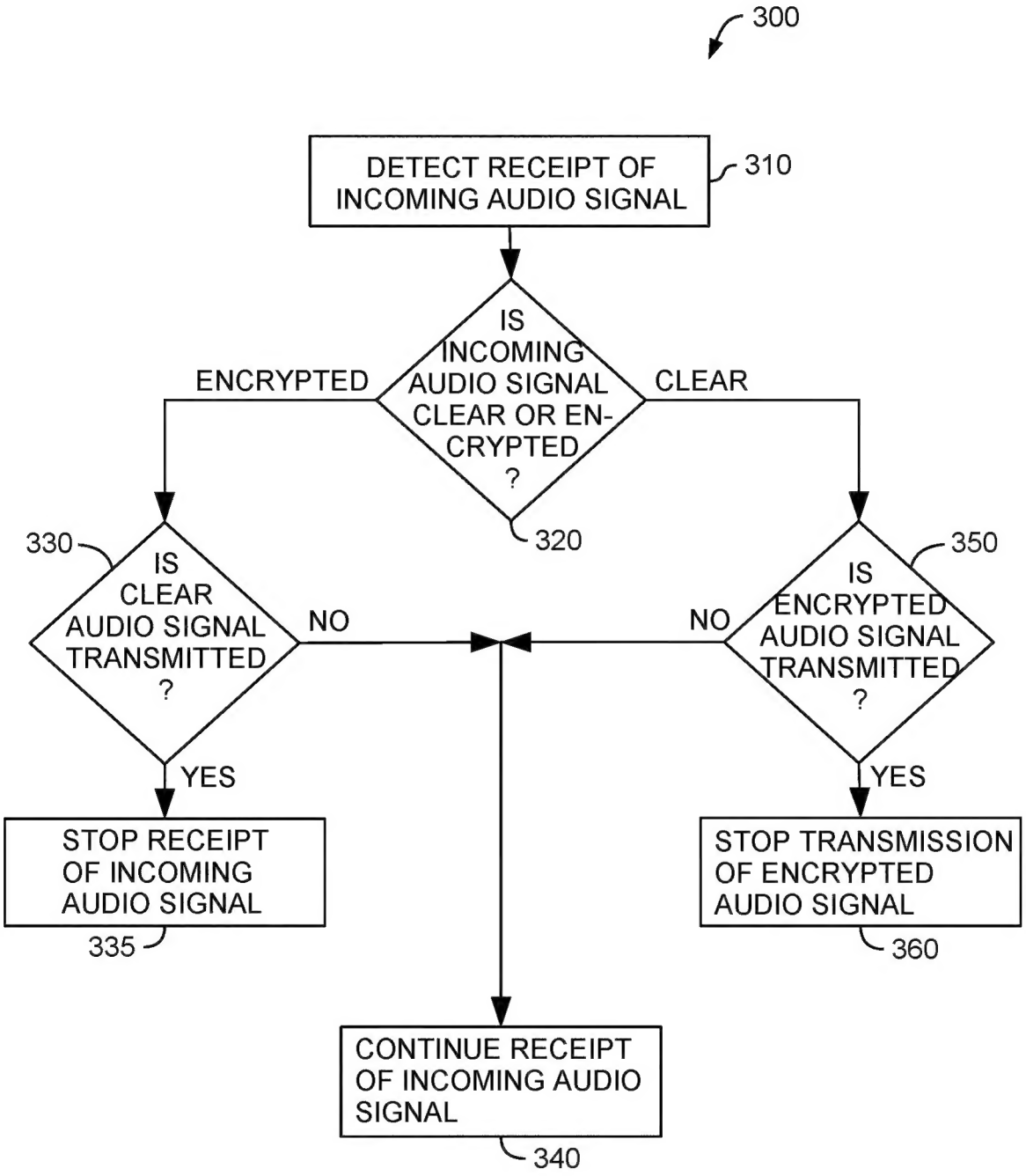

300
DETECT RECEIPT OF INCOMING AUDIO SIGNAL
310
IS INCOMING AUDIO SIGNAL CLEAR OR ENCRYPTED ?
320
ENCRYPTED
CLEAR
330
IS CLEAR AUDIO SIGNAL TRANSMITTED ?
NO
YES
STOP RECEIPT OF INCOMING AUDIO SIGNAL
335
350
IS ENCRYPTED AUDIO SIGNAL TRANSMITTED ?
NO
YES
STOP TRANSMISSION OF ENCRYPTED AUDIO SIGNAL
360
CONTINUE RECEIPT OF INCOMING AUDIO SIGNAL
340

FIG. 3

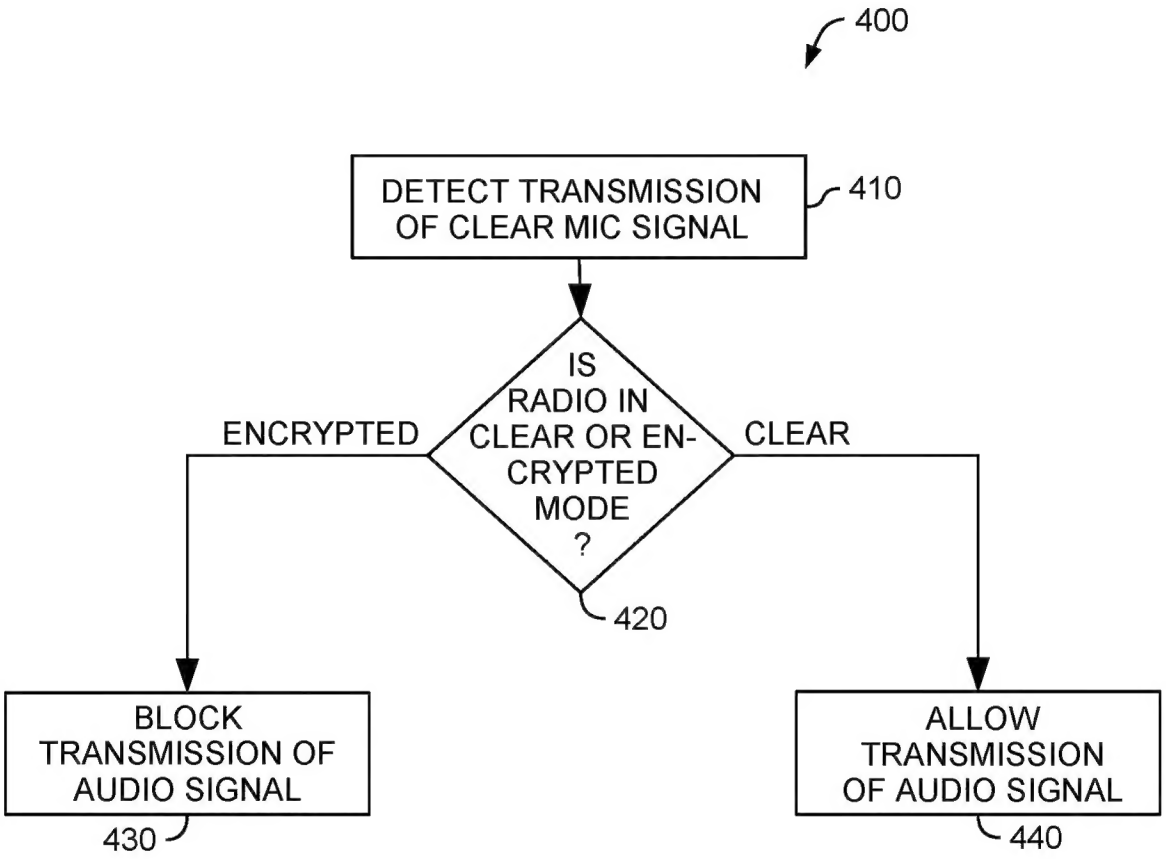

400
DETECT TRANSMISSION OF CLEAR MIC SIGNAL
410
IS RADIO IN CLEAR OR EN-CRYPTED MODE ?
420
ENCRYPTED
CLEAR
BLOCK TRANSMISSION OF AUDIO SIGNAL
430
ALLOW TRANSMISSION OF AUDIO SIGNAL
440

FIG. 4

COMMUNICATION SYSTEM FOR AN AIRCRAFT

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to European patent application No. EP 22400001.8 filed on Mar. 30, 2022, the disclosure of which is incorporated in its entirety by reference herein.

TECHNICAL FIELD

[0002] The present disclosure relates to a communication system for an aircraft, comprising a plurality of radios and an intercom system that interconnects the plurality of radios. The present disclosure further relates to an aircraft comprising such a communication system, as well as a method of operating such a communication system.

BACKGROUND

[0003] The documents US 9 100 361 B1 and EP 2 779 480 B1 respectively describe a communication system with a plurality of radios and an intercom system in an aircraft. The radios of the plurality of radios in the document EP 2 779 480 B1 are implemented as wireless communications units.

[0004] More generally, communication systems with a plurality of radios which are connected via a plurality of communication lines to an intercom system that interconnects the plurality of radios are well-known in aviation and widely used in different types of aircrafts. However, an underlying system complexity of a communication system in a given aircraft largely depends on a respective use of the given aircraft, i.e., on whether the given aircraft is foreseen for civil, parapublic or military use.

[0005] In civil and parapublic use, there are normally no particular restrictions imposed on communication systems in aircrafts with respect to protection of potentially sensitive audio signals. Thus, there is no need for electrical separation or blocking and no prevention of electrical coupling of potentially sensitive audio signals e.g., into microphone signals which are transmitted in clear form.

[0006] In contrast thereto, communication systems in aircrafts which are foreseen for military use must guarantee a comparatively high level of protection of potentially sensitive audio signals. Illustrative communication systems in general, i.e., independent of use with an aircraft, which guarantee a certain level of protection of potentially sensitive audio signals, are e.g., described in the documents US 4 167 700 A and EP 0 779 760 B1.

[0007] In aircrafts, however, a comparatively high level of protection of potentially sensitive audio signals is usually achieved by use of a highly sophisticated and expensive so-called TEMPEST (Telecommunications Electronic Material Protected from Emanating Spurious Transmission) proven communication system. More particularly, such a TEMPEST proven communication system prevents coupling of decrypted audio signals into clear, i.e., unencrypted audio signals by technical/electrical separation of these signals into so-called red and black areas, by filtering of these signals to prevent coupling by power supply, and by physical distance separation of an underlying wire routing. An illustrative TEMPEST proven system with associated red and black areas is described in the document EP 2 658 173 B1.

[0008] Provision of such a TEMPEST proven communication system in a given aircraft is required to obtain, by the respectively competent authorities, an approval for participation of the given aircraft in military missions. By way of example, such an approval is given in Germany by the Federal Office for Information Security (BSI) as competent authority and it is forbidden to use the given aircraft in military missions without such an approval.

[0009] However, all measures required for installation of a TEMPEST proven communication system in an aircraft lead to a comparatively high development effort and a comparatively high system complexity. Furthermore, sufficient space must be available in the aircraft to enable physical separation of audio signals by physical distance separation of an underlying wire routing, thus, resulting in a high installation effort. In particular cases, installation of optical signal transmission may even be required with a comparatively high installation effort per se.

[0010] As a consequence, installation of such a TEMPEST proven communication system in a small helicopter that should be used in military missions, such as e.g., the Airbus Helicopters H145M, is complicated and expensive.

[0011] The document US4903298 describes .voice and data radio communication between an aircraft in flight and a ground station. The aircraft has a plurality of radio transceivers and an audio control system to selectively route audio inputs and outputs from one of the transceivers to an audio device. Control switches controlled manually an encryption unit. The encryption unit may be bypassed in a clear mode (un-encrypted) and paths from the aircraft audio routing system are connected directly to the respective transceivers in the un-encrypted mode.

SUMMARY

[0012] It is, therefore, an object of the present disclosure to provide a new communication system for an aircraft, which provides for a comparatively high level of protection of potentially sensitive audio signals such that an aircraft that is equipped with this new communication system may obtain approval for participation in military missions by the competent authorities.

[0013] This object is solved by a communication system with a plurality of radios which are connected via a plurality of communication lines to an intercom system that interconnects the plurality of radios, said communication system comprising the features of claim 1.

[0014] More specifically, a communication system for an aircraft is provided, comprising a plurality of radios, an intercom system, and a security module. The plurality of radios includes at least a first radio that is operable in an encrypted mode for transmitting/receiving encrypted audio signals, and a second radio that is operable in a clear mode for transmitting/receiving unencrypted audio signals. The intercom system interconnects the plurality of radios, wherein the plurality of radios is connected to the intercom system via a plurality of communication lines. The security module is configured to connect or disconnect selected ones of the plurality of communication lines for inhibiting simultaneous transmission of an encrypted audio signal via the first radio and an unencrypted audio signal via the second radio.

[0015] Advantageously, provision of the security module enables an unintended dissemination of confidential information by simply blocking reception/transmission of potentially sensitive encrypted or decrypted audio signals. Thereby, a communication system may be provided, which is inexpensive, light weight and simple to install.

[0016] With the disclosure, the security module is configured for inhibiting simultaneous transmission thus involving an automated inhibiting. This inhibiting automatically prevents simultaneous transmission of encrypted and unencrypted signals. With the inhibiting logic, the disclosure can for instance solve any conflict between simultaneous transmission of encrypted and unencrypted signals without any manual crew action, e.g., thanks to feeding results of detections to logic to inform the security module about which signal is encrypted or unencrypted.

[0017] More specifically, a comparatively uncomplex and inexpensive communication system that is adapted for civil or parapublic use may be used together with the security module for obtention of at least a minimum of approvals for military use from the respectively competent authorities. Even respective installation approvals of the communication system that is adapted for civil or parapublic use may be reapplied. In conclusion, this comparatively uncomplex and inexpensive communication system together with the security module may be used in aircrafts that are foreseen for military use instead of an expensive and heavy TEMPEST proven communication system and wiring.

[0018] According to one aspect, the security module is adapted to detect if a received audio signal is received by a radio of the communication system of a given aircraft on an encrypted channel and is then decrypted. If at the same time an audio transmission on a clear, i.e., unencrypted or non-crypted channel happens, the security module stops reception of the encrypted audio signal already inside the radio or just at a respective audio output of the radio. Thus, coupling of sensitive information on communication lines, e.g., cables inside the given aircraft, or inside the intercom system is prevented.

[0019] Vice versa: if a sensitive audio signal is going to be encrypted and then being transmitted, and at the same time a clear, i.e., unencrypted or non-crypted audio signal is received at a radio of the communication system, transmission of the encrypted audio signal is blocked. In fact, the received clear audio signal may couple into the sensitive audio signal that is going to be encrypted and then being transmitted. Knowing that the clear audio signal would be hidden in the encrypted and transmitted audio signal, and knowing further the clear audio signal by just spying it on a respective radio frequency, a correlation between the clear audio signal and the encrypted audio signal is possible. By this correlation a re-calculation of an applied crypto key used for encryption can be performed so that the crypto key is detectable and may be determined. To prevent this, the security module generally blocks, by logic, transmission of an encrypted audio signal whenever a clear audio signal is received on a different radio at the same time.

[0020] According to one aspect, when a radio or, more generally, an audio channel is blocked, this may be indicated by a suitable indicator, light or message in a primary display system of the given aircraft.

[0021] Furthermore, according to one aspect the security module may be switched off. Thus, civil approval of the communication system is reached as, in this case, all audio signals are connected according to civil airworthiness approval regulations of the communication system.

[0022] Preferably, the security module is configured to deactivate the first radio for blocking receipt or transmission of an encrypted audio signal at the first radio, if the second radio is sending or receiving an unencrypted audio signal.

[0023] Preferably, the security module is configured to deactivate the first radio for blocking receipt of an encrypted audio signal at the first radio by disabling receipt of the encrypted audio signal at the first radio and/or disabling transmission of the encrypted audio signal via the first radio to the intercom system after decryption.

[0024] Preferably, the security module is configured to send a discrete blocking command to the first radio for disabling receipt of the encrypted audio signal at the first radio.

[0025] Preferably, the security module is configured to interrupt a communication line of the plurality of communication lines that connects the first radio to the intercom system for disabling transmission of the encrypted audio signal via the first radio to the intercom system after decryption.

[0026] Preferably, the security module is configured to deactivate the first radio for blocking transmission of an encrypted audio signal via the first radio before encryption, if the second radio is sending or receiving an unencrypted audio signal.

[0027] According to one aspect, the security module may block transmission of an encrypted audio signal via the first radio by sending a discrete blocking command to the first radio for disabling transmission of the encrypted audio signal via the first radio.

[0028] Preferably, the security module is configured to detect receipt of an encrypted audio signal via the first radio, or of an unencrypted audio signal via the second radio.

[0029] Preferably, the security module is configured to detect receipt of an encrypted audio signal via the first radio, or of an unencrypted audio signal via the second radio, by monitoring associated receipt indication lines of the first and second radios.

[0030] Preferably, the communication system further comprises at least one indicator for indicating deactivation of the first radio.

[0031] According to one aspect, the at least one indicator comprises at least one summary indicator for indicating deactivation of a predetermined number of radios of the plurality of radios.

[0032] Preferably, the at least one indicator is controlled by means of the security module.

[0033] According to one aspect, the security module is connected to the intercom system via an associated information transmission line, such that the intercom system may provide information, such as status information, to the security module.

[0034] Preferably, the communication system further comprises a switch that is provided to enable switching-off of the security module.

[0035] The present disclosure further relates to an aircraft comprising a communication system as described above.

[0036] The present disclosure further relates to a method of operating a communication system as described above, comprising: detecting receipt of an incoming audio signal via a radio of the communication system; determining whether the incoming audio signal is encrypted or unen-

crypted; if the incoming audio signal is encrypted, determining whether transmission of an unencrypted audio signal via another radio is in progress; and if transmission of an unencrypted audio signal via another radio is in progress, blocking receipt of the incoming audio signal.

[0037] Preferably, the method further comprises: if the incoming audio signal is unencrypted, determining whether transmission of an encrypted audio signal via another radio is in progress; and if transmission or receipt of an encrypted audio signal via another radio is in progress, blocking transmission of the encrypted audio signal.

[0038] Preferably, the method further comprises: providing a visible and/or audible indication, if receipt of the incoming audio signal is blocked, or if transmission of the encrypted audio signal is blocked.

BRIEF DESCRIPTION OF THE DRAWINGS

[0039] Preferred embodiments are outlined by way of example in the following description with reference to the attached drawings. In these attached drawings, identical or identically functioning components and elements are labeled with identical reference numbers and characters and are, consequently, only described once in the following description.

[0040] FIG. **1** shows a side view of an illustrative aircraft with a communication system in accordance with some embodiments;

[0041] FIG. **2** shows a schematic view of the communication system of FIG. **1** in accordance with some embodiments;

[0042] FIG. **3** shows a flow diagram illustrating an operation of the communication system of FIG. **2** in accordance with some embodiments; and

[0043] FIG. **4** shows a flow diagram illustrating another operation of the communication system of FIG. **2** in accordance with some embodiments.

DETAILED DESCRIPTION

[0044] FIG. **1** shows an illustrative aircraft **100**. By way of example, the aircraft **100** is embodied as a rotary-wing aircraft and, more particularly, as a helicopter. Thus, for purposes of simplicity and clarity, the aircraft **100** is hereinafter referred to as the "helicopter **100**". However, the present disclosure is likewise applicable to other types of aircrafts, such as airplanes, quadcopters, and so on, and may even be used in spacecrafts.

[0045] According to one aspect of the present disclosure, the helicopter **100** comprises a communication system **200**. A preferred embodiment of the communication system **200** is described below at FIG. **2**.

[0046] Illustratively, the helicopter **100** further comprises at least one main rotor **110** with a rotor shaft **115**. By way of example, the at least one main rotor **110** is embodied as a multiblade rotor system, for providing lift and forward or backward thrust during operation. Accordingly, the at least one main rotor **110** comprises a plurality of rotor blades **112**, **113** which are e.g., mounted at an associated rotor head **114** to the rotor shaft **115**.

[0047] Illustratively, the helicopter **100** has a fuselage **120** that forms an airframe of the helicopter **100**. The fuselage **120** may be connected to a suitable landing gear and forms, by way of example, a cabin **123** and a rear fuselage **127**. The rear fuselage **127** is illustratively connected to a tail boom **130**.

[0048] By way of example, the helicopter **100** includes at least one counter-torque device **140** configured to provide counter-torque during operation, i.e., to counter the torque created by rotation of the at least one main rotor **110** for purposes of balancing the helicopter **100** in terms of yaw. If desired, counter-torque device **140** may be shrouded as shown.

[0049] The at least one counter-torque device **140** is illustratively provided at an aft section of the tail boom **130** and comprises a tail rotor **145**. The aft section of the tail boom **130** further comprises a fin **150**. Illustratively, the tail boom **130** is also provided with a suitable horizontal stabilizer **135**.

[0050] FIG. **2** shows the communication system **200** of FIG. **1**. Preferably, the communication system **200** comprises at least a plurality of radios **210**, an intercom system **220**, and a security module **240**. By way of example, the plurality of radios **210** comprises a predetermined number N of radios. Illustratively, three radios of the predetermined number N of radios are separately labeled with the reference signs **212**, **214**, **216**.

[0051] The plurality of radios **210** is preferably connected to the intercom system **220** via a plurality of communication lines **230**. Thus, the intercom system **220** interconnects the plurality of radios **210**. The intercom system **220** is illustratively also connected to the security module **240** via an associated information transmission line **225**, such that the intercom system **220** may provide information, such as status information, to the security module **240**.

[0052] Preferably, at least one radio of the plurality of radios **210**, e.g., the radio **212**, is operable in an encrypted mode for transmitting/receiving encrypted audio signals. Furthermore, preferably at least one other radio of the plurality of radios **210**, e.g., the radio **214**, is operable in a clear mode for transmitting/receiving unencrypted audio signals, which may also be referred to as "clear audio signals".

[0053] The radio **212** is illustratively connected to the intercom system **220** via associated communication lines **232**, **234** of the plurality of communication lines **230**. Similarly, the radio **214** is connected to the intercom system **220** via associated communication lines **236**, **238** of the plurality of communication lines **230**. However, for simplicity and clarity of the drawing respective communication lines which connect the radio **216** to the intercom system **220** are not separately labeled.

[0054] Illustratively, the plurality of radios **210** is connected to the security module **240** via a plurality of connection lines **250**. By way of example, the radio **212** is connected to the security module **240** via associated connection lines **252**, **254** of the plurality of connection lines **250**. Similarly, the radio **214** is connected to the security module **240** via associated connection lines **256**, **258** of the plurality of connection lines **250**. However, for simplicity and clarity of the drawing respective connection lines which connect the radio **216** to the security module **240** are not separately labeled.

[0055] In addition, one or more headsets may be connected to the intercom system **220** and the security module **240**. By way of example, two headsets **217**, **218** are illustratively connected to the intercom system **220** and the security module **240**. By way of example, the headset **217** may be provided for a co-pilot of the helicopter **100** of FIG. **1**, and

the headset **218** may be provided for a pilot of the helicopter **100** of FIG. **1**.

[0056] More specifically, the headset **217** is connected to the intercom system **220** via associated communication lines **233**, **235** of the plurality of communication lines **230**, and to the security module **240** via associated connection lines **253**, **255** of the plurality of connection lines **250**. Similarly, the headset **218** is connected to the intercom system **220** via associated communication lines **237**, **239** of the plurality of communication lines **230**, and to the security module **240** via associated connection lines **257**, **259** of the plurality of connection lines **250**. The connection lines **253**, **257** may be used to break sending of microphone signals from the headsets **217**, **218** to the intercom system **220**. The connection lines **255**, **259** may be used to suppress respective Push-To-Talk (PTT) signals from the headsets **217**, **218** to the intercom system **220**.

[0057] The security module **240** may further be connected to one or more associated indicators **260** which are provided for indicating e.g., status information of the security module **240** and, more generally, of the communication system **200** in operation. According to one aspect, the one or more associated indicators **260** comprise at least one summary indicator for indicating deactivation of a predetermined number of radios of the plurality of radios.

[0058] More specifically, at least one of the one or more indicators **260** may visibly and/or audibly indicate deactivation of an associated radio of the plurality of radios **210**, e.g., the radio **212**. Preferably, the at least one of the one or more indicators **260** is controlled by the security module **240**.

[0059] Moreover, the security module **240** may be provided with a switch **270**, which is preferably provided to enable switching of the communication system **200** from a civil/parapublic operating mode to a military operating mode. By way of example, the switch **270** may be an ON/OFF switch that is provided to enable switching-off of the security module **240**. In other words, the switch **270** may e.g., be set to "ON" for activating the security module **240** in the military operating mode, and it may be set to "OFF" for switching-off, i.e., deactivating the security module **240** in the civil/parapublic operating mode.

[0060] Preferably, the security module **240** is configured to connect or disconnect selected ones of the plurality of communication lines **230** for inhibiting simultaneous transmission of an encrypted audio signal via one of the radios of the plurality of radios **210**, e.g., the radio **212**, and an unencrypted audio signal via another one of the plurality of radios **210**, e.g., the radio **214**. For instance, the security module **240** may be configured to deactivate the radio **212** for blocking receipt or transmission of an encrypted audio signal at the radio **212**, if the radio **214** is sending or receiving an unencrypted audio signal. More specifically, the security module **240** may be configured to deactivate the radio **212** for blocking receipt of an encrypted audio signal at the radio **212** by disabling receipt of the encrypted audio signal at the radio **212** and/or disabling transmission of the encrypted audio signal via the radio **212** to the intercom system **220** after decryption.

[0061] By way of example, the security module **240** may deactivate the radio **212** for blocking receipt of the encrypted audio signal by sending a discrete blocking command to the radio **212** for disabling receipt of the encrypted audio signal at the radio **212**. Preferably, the discrete blocking command is sent from the security module **240** via the connection line **252** to the radio **212**.

[0062] Alternatively, or in addition, the security module **240** may deactivate the radio **212** for disabling transmission of the encrypted audio signal via the radio **212** to the intercom system **220** after decryption by interrupting the communication line **232** of the plurality of communication lines **230** that connects the radio **212** to the intercom system **220**. Thus, transmission of the encrypted audio signal via the radio **212** to the intercom system **220** after decryption is prevented and, as a result, the radio **212** is deactivated.

[0063] Preferably, the security module **240** is further configured to deactivate a radio of the plurality of radios **210**, e.g., the radio **212**, for blocking transmission of an encrypted audio signal via this radio, i.e., the radio **212**, before encryption, if another one of the plurality of radios **210**, e.g., the radio **214**, is sending or receiving an unencrypted audio signal. For instance, the security module **240** may block transmission of an encrypted audio signal via the radio **212** by sending a discrete blocking command to the radio **212** for disabling transmission of the encrypted audio signal via the radio **212**. Preferably, the discrete blocking command is sent from the security module **240** via the connection line **252** to the radio **212**.

[0064] Furthermore, the security module **240** may be configured to detect receipt of an encrypted audio signal via one radio of the plurality of radios **210**, e.g., the radio **212**, and/or of an unencrypted audio signal via another one of the plurality of radios **210**, e.g., the radio **214**. Preferably, the security module **240** is configured to detect receipt of an encrypted audio signal via the radio **212** by monitoring the connection line **254** that connects the radio **212** to the security module **240** and, thus, functions as a receipt indication line. Similarly, the security module **240** is configured to detect receipt of an unencrypted audio signal via the radio **214** by monitoring the connection line **258** that connects the radio **214** to the security module **240** and, thus, also functions as a receipt indication line.

[0065] FIG. **3** shows an illustrative method **300** of operating the communication system **200** of FIG. **2**, e.g., in the helicopter **100** of FIG. **1**. According to one aspect, the method **300** comprises a plurality of steps which are preferably performed by the security module **240** of the communication system **200** of FIG. **2**.

[0066] The method starts at step **310** with detection of an incoming audio signal. More specifically, at step **310** receipt of an incoming audio signal via a first radio of the plurality of radios **210** of the communication system **200** of FIG. **2** is detected. For instance, the receipt is detected by monitoring the plurality of connection lines **250** of FIG. **2**, which function as receipt indication lines.

[0067] At step **320**, it is determined whether the incoming audio signal that is received via the first radio is encrypted or unencrypted, i.e., clear. If the incoming audio signal is encrypted, e.g., if the incoming audio signal is received via the radio **212** of FIG. **2**, the method **300** continues at step **330**.

[0068] At step **330**, it is determined whether transmission of an unencrypted audio signal via another, i.e., a second radio of the plurality of radios **210** of FIG. **2** is in progress, e.g., via the radio **214** of FIG. **2**. For instance, the transmission is detected by monitoring the plurality of connection lines **250** of FIG. **2**, which function as receipt indication lines.

[0069] If transmission of an unencrypted audio signal via the second radio, e.g., via the radio **214** of FIG. **2**, is in progress, the method **300** continues at step **335**. Otherwise, the method **300** continues at step **340**, where receipt of the incoming audio signal via the first radio is authorized and continued.

[0070] At step **335**, receipt of the incoming audio signal via the first radio is blocked. For instance, the first radio is deactivated for blocking receipt of the incoming audio signal by sending a discrete blocking command to the first radio for disabling receipt of the incoming audio signal at the first radio. Alternatively, or in addition, the first radio may be deactivated for disabling transmission of the incoming audio signal via the first radio to the intercom system **220** of FIG. **2** after decryption, by interrupting the communication line that connects the first radio to the intercom system **220** of FIG. **2**, i.e., the communication line **232** of FIG. **2**. Thus, transmission of the encrypted audio signal via the first radio to the intercom system **220** after decryption is prevented and, as a result, the first radio is deactivated.

[0071] If, however, it is determined at step **320** that the incoming audio signal that is received via the first radio is unencrypted, i.e., clear, e.g., if the incoming audio signal is received via the radio **214** of FIG. **2**, then the method **300** continues at step **350**.

[0072] At step **350**, it is determined whether transmission of an encrypted audio signal via another, i.e., a second radio of the plurality of radios **210** of FIG. **2** is in progress, e.g., via the radio **212** of FIG. **2**. For instance, the transmission is detected by monitoring the plurality of connection lines **250** of FIG. **2**, which function as receipt indication lines.

[0073] If transmission of an encrypted audio signal via the second radio, e.g., via the radio **212** of FIG. **2**, is in progress, the method **300** continues at step **360**. Otherwise, the method **300** continues again at step **340**, where receipt of the incoming audio signal via the first radio, e.g., via the radio **214** of FIG. **2**, is authorized and continued.

[0074] At step **360**, transmission of the encrypted audio signal via the second radio is blocked. For instance, the second radio is deactivated for blocking transmission of the encrypted audio signal by sending a discrete blocking command to the second radio for disabling transmission of the encrypted audio signal via the second radio. Preferably, the second radio is deactivated before encryption.

[0075] Optionally, the method **300** may further comprise a step of providing a visible and/or audible indication, if receipt of the incoming audio signal is blocked at step **335**, or if transmission of the encrypted audio signal is blocked at step **360**. In other words, provision of a respective visible and/or audible indication is considered to be part of the steps **335** and **360**. By way of example, a suitable visible and/or audible indication may be provided by the one or more associated indicators **260** of FIG. **2**.

[0076] FIG. **4** shows an illustrative method **400** of operating the communication system **200** of FIG. **2**, e.g., in the helicopter **100** of FIG. **1**. According to one aspect, the method **400** comprises a plurality of steps which are preferably performed by the security module **240** of the communication system **200** of FIG. **2**.

[0077] The method **400** starts at step **410** with detection of a transmission of an unencrypted, i.e., clear microphone signal, e.g., an unencrypted microphone signal coming from the co-pilot headset **217** of FIG. **2** or the pilot headset **218** of FIG. **2**.

[0078] At step **420**, it is determined which radios of the plurality of radios **210** of the communication system **200** of FIG. **2** operate in encrypted mode and which operate in unencrypted, i.e., clear mode. Thus, at step **430** transmission of audio signals via all radios of the plurality of radios **210** which operate in encrypted mode is blocked, while at step **440** transmission of audio signals via all radios of the plurality of radios **210** which operate in unencrypted, i.e., clear mode is authorized during the transmission of the unencrypted, i.e., clear microphone signal.

[0079] Optionally, the method **400** may further comprise a step of providing a visible and/or audible indication, if transmission of audio signals via all radios of the plurality of radios **210** which operate in encrypted mode is blocked. In other words, provision of a respective visible and/or audible indication is considered to be part of the step **430**. By way of example, a suitable visible and/or audible indication may be provided by the one or more associated indicators **260** of FIG. **2**.

Reference List

100	aircraft
110	main rotor
112,	rotor blades
113	
114	rotor head
115	rotor shaft
120	fuselage
123	cabin
127	rear fuselage
130	tail boom
135	horizontal stabilizer
140	counter-torque device
145	tail rotor
150	fin
200	communication system
210	plurality of radios
212,	radios
214,	
216	
217	headset co-pilot
218	headset pilot
220	aircraft intercom system
225	information transmission line
230	plurality of communication lines
232,	communication lines
233,	
234,	
235,	
236,	
237,	
238,	
239	
240	communications security monitoring and control device
250	plurality of connection lines
252,	connection lines
253,	
254,	
255,	
256,	
257,	
258,	
259	
260	indicators
270	switch
300	method
310,	method steps
320,	
330,	
335,	
340,	
350,	

-continued

Reference List	
360	
400	method
410, **420**, **430**, **440**	method steps

What is claimed is:

1. A communication system for an aircraft, comprising:

a plurality of radios including at least:

a first radio that is operable in an encrypted mode for transmitting/receiving encrypted audio signals,

a second radio that is operable in a clear mode for transmitting/receiving unencrypted audio signals;

an intercom system that interconnects the plurality of radios, wherein the plurality of radios is connected to the intercom system via a plurality of communication lines; and

a security module that is configured to connect or disconnect selected ones of the plurality of communication lines between the plurality of radios and the intercom system inhibit simultaneous transmission of an encrypted audio signal via the first radio and an unencrypted audio signal via the second radio.

2. The communication system of claim **1**, wherein the security module is configured to deactivate the first radio for blocking receipt or transmission of an encrypted audio signal at the first radio, if the second radio is sending or receiving an unencrypted audio signal.

3. The communication system of claim **2**, wherein the security module is configured to deactivate the first radio for blocking receipt of an encrypted audio signal at the first radio by disabling receipt of the encrypted audio signal at the first radio and/or disabling transmission of the encrypted audio signal via the first radio to the intercom system after decryption.

4. The communication system of claim **3**, wherein the security module is configured to send a discrete blocking command to the first radio for disabling receipt of the encrypted audio signal at the first radio.

5. The communication system of claim **3**, wherein the security module is configured to interrupt a communication line of the plurality of communication lines that connects the first radio to the intercom system for disabling transmission of the encrypted audio signal via the first radio to the intercom system after decryption.

6. The communication system of claim **1**, wherein the security module is configured to deactivate the first radio for blocking transmission of an encrypted audio signal via the first radio before encryption, if the second radio is sending or receiving an unencrypted audio signal.

7. The communication system of claim **1**, wherein the security module is configured to detect receipt of an encrypted audio signal via the first radio, or of an unencrypted audio signal via the second radio.

8. The communication system of claim **7**, wherein the security module is configured to detect receipt of an encrypted audio signal via the first radio, or of an unencrypted audio signal via the second radio, by monitoring associated receipt indication lines of the first and second radios.

9. The communication system of claim **1**, further comprising at least one indicator for indicating deactivation of the first radio.

10. The communication system of claim **9**, wherein the at least one indicator is controlled by means of the security module.

11. The communication system of claim **1**, further comprising a switch that is provided to enable switching-off of the security module.

12. An aircraft comprising the communication system of claim **1**.

13. A method of operating a communication system according to claim **1**, comprising:

detecting receipt of an incoming audio signal via a radio of the communication system,

determining whether the incoming audio signal is encrypted or unencrypted,

if the incoming audio signal is encrypted, determining whether transmission of an unencrypted audio signal via another radio is in progress, and

if transmission of an unencrypted audio signal via another radio is in progress, blocking (335) receipt of the incoming audio signal.

14. The method of claim **13**, further comprising:

if the incoming audio signal is unencrypted, determining whether transmission of an encrypted audio signal via another radio is in progress, and

if transmission of an encrypted audio signal via another radio is in progress, blocking transmission of the encrypted audio signal.

15. The method of claim **13**, further comprising:

providing a visible and/or audible indication, if receipt of the incoming audio signal is blocked, or if transmission of the encrypted audio signal is blocked.

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